

# TP200 precision touch-trigger probe system with stylus changer

- **High speed stylus changing**
- **Precision measuring performance with stylus lengths of up to 100 mm**
- **Module life of over 10 million triggers**
- **Compatible with the full range of Renishaw M8 probe heads (PH10M/MQ via PAA) and extensions bars**



## System description

TP200 is an electronic probe using strain gauge technology which gives higher accuracy than kinematic touch-trigger probes. TP200 combines outstanding metrology performance with superior functionality to produce a highly versatile DCC CMM probing system with excellent productivity.

The TP200 system components are the TP200 probe body, TP200 stylus module, PI 200 probe interface and SCR200 stylus change rack (optional).

### TP200 probe

The TP200 probe incorporates micro strain gauge transducers, delivering excellent repeatability and accurate 3D form measurement, even with long styli. The solid-state ASIC (application specific integrated circuit) electronics within the probe ensure reliable operation over millions of trigger points.

The stylus module is mounted on the probe via a highly repeatability magnetic kinematic joint, providing rapid stylus changing capability and probe overtravel protection. There are three stylus modules available offering two different overtravel forces. The standard force (SF) module is suitable for most applications. The low force (LF) module is recommended for use with small precision ball styli or on delicate material. The extended overtravel (EO) module has the same overtravel force as the standard module but has an addition 8 mm of overtravel in the Z axis to protect against damage.

### PI 200 probe interface

The PI 200 is capable of automatic recognition and interfacing of the TP200 probe or conventional touch-trigger probes (TP2, TP6, TP20). During high speed position moves, the PI 200 is able to minimise probe sensitivity to prevent vibration triggers, but, a trigger will be transmitted in the event of a collision.

### SCR200

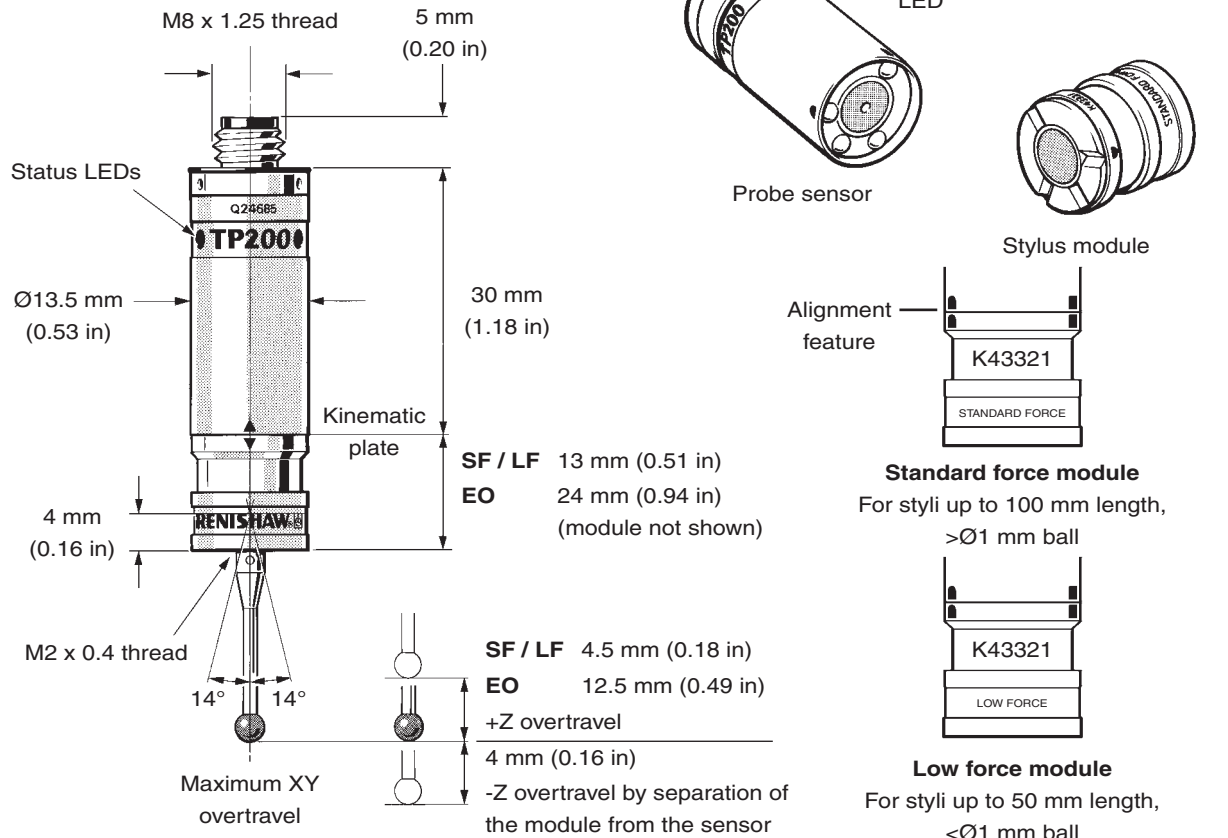
The SCR200 has six ports and provides rapid, automatic changing of the stylus modules without the need to re-qualify stylus tips. The SCR200 is powered entirely by the PI 200 and provides features to facilitate safe stylus changing.

### Accessories

The Renishaw 'GF' range of styli and extension pieces, incorporating carbon fibre reinforced plastic (CFRP) stems, is available for applications requiring high performance and long reaches.

The TP200 is supplied with specialised material for cleaning the kinematic coupling faces.

### TP200 dimensions



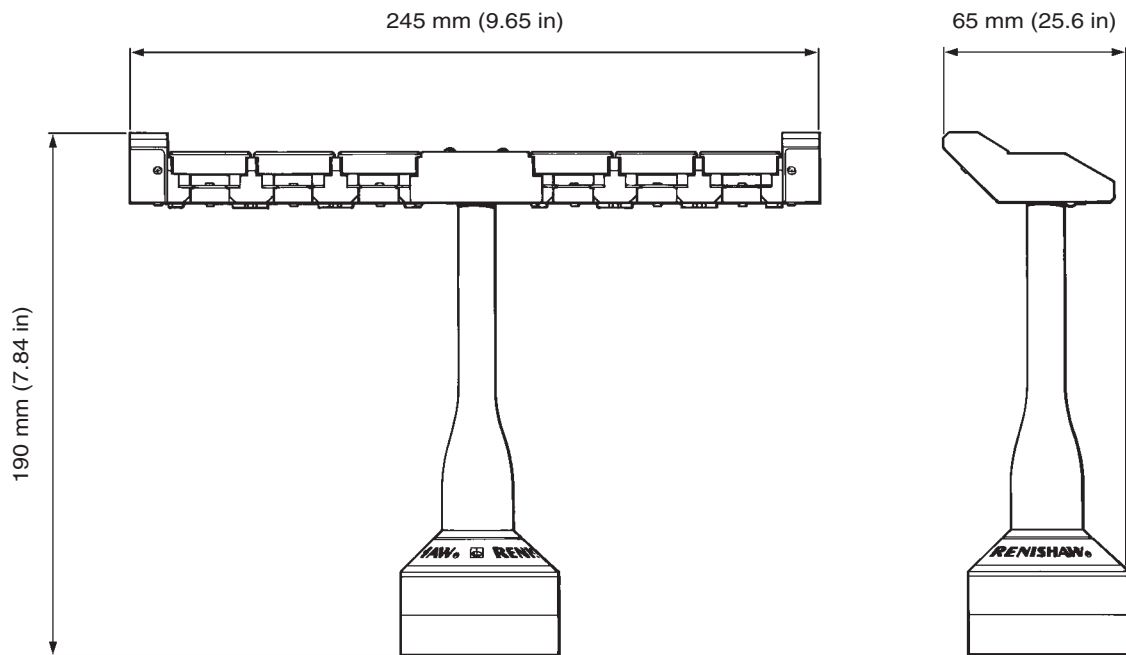
### Specification

|   |   |              |  |              |
|---|---|--------------|--|--------------|
| <b>Application</b>                              | Universal CMM precision touch-trigger probe     |              |  |              |
| <b>Sense direction</b>                          | 6-way: ±X, ±Y, ±Z                               |              |  |              |
| <b>Measuring performance *</b>                  | 10 mm stylus                                    |              | 50 mm stylus                           |              |
|   | <b>TP200</b>                                    | <b>(TP2)</b> | <b>TP200</b>                           | <b>(TP2)</b> |
| <b>2σ unidirectional repeatability (µm)</b>     | 0.30  | (0.35)       | 0.40                                   | (1.00)       |
| <b>2D form measurement deviation (µm) †</b>     | ±0.40   | (±0.80)      | ±0.80                                  | (±2.50)      |
| <b>3D form measurement deviation (µm) †</b>     | ±0.65   | (±1.00)      | ±1.00                                  | (±4.00)      |
| <b>Module operational life</b>                  | 10 × 10 <sup>6</sup> measurement points minimum |              |  |              |
| <b>Trigger force (at 50 mm) *</b>               | XY: <0.02 N (2 gf)                              |              |  |              |
|   | Z: <0.07 N (7 gf)                               |              |  |              |
| <b>Overtravel force (at 50 mm)</b>              | <b>Standard force module</b>                    |              | <b>Low force module</b>                |              |
|   | XY: 0.15 N to 0.35 N<br>(15 gf to 35 gf)        |              | XY: 0.05 N to 0.1 N<br>(5 gf to 10 gf) |              |
|   | +Z: 4 N to 14 N<br>(400 gf to 1400 gf)          |              | +Z: 1 N to 10 N<br>(100 gf to 1000 gf) |              |
|   | -Z: 8 N (800 gf)                                |              | -Z: 8 N (800 gf)                       |              |
| <b>Overtravel</b>                               | <b>Standard force module</b>                    |              | <b>Low force module</b>                |              |
|   | XY: ±14°  |              | XY: ±14°                               |              |
|   | +Z: 4.5 mm                                      |              | +Z: 4.5 mm                             |              |
|   | -Z: 2.00 mm                                     |              | -Z: 2.00 mm                            |              |
| <b>Maximum recommended stylus length: Steel</b> | 50 mm   |              | 20 mm                                  |              |
| <b>Renishaw GF</b>                              | 100 mm  |              | 50 mm                                  |              |
| <b>Maximum stylus mass</b>                      | 8 g at 50 mm                                    |              | 3 g at 20 mm                           |              |
| <b>Probing speeds: Operational</b>              | 0.5 mm/s to 50 mm/s                             |              |  |              |
|   | <b>Optimum</b> 1.00 mm/s to 15 mm/s             |              |  |              |
| <b>Trigger rate</b>                             | 5 points per second                             |              |  |              |
| <b>Weight</b>                                   | 22 g (sensor 15 g, stylus module 7 g)           |              |  |              |
| <b>Stylus mounting</b>                          | M2 x 0.4 thread                                 |              |  |              |
| <b>Probe mounting</b>                           | M8 bush (polarity sensitive)                    |              |  |              |
| <b>Probe interface</b>                          | PI 200 only                                     |              |  |              |

\* Specified at trigger level 1 at 8 mm/s probing speed for standard force and low force modules

† Systematic errors contributed by the probe when used for 2D circular and 3D spherical measurement

## SCR200 dimensions



## Specification

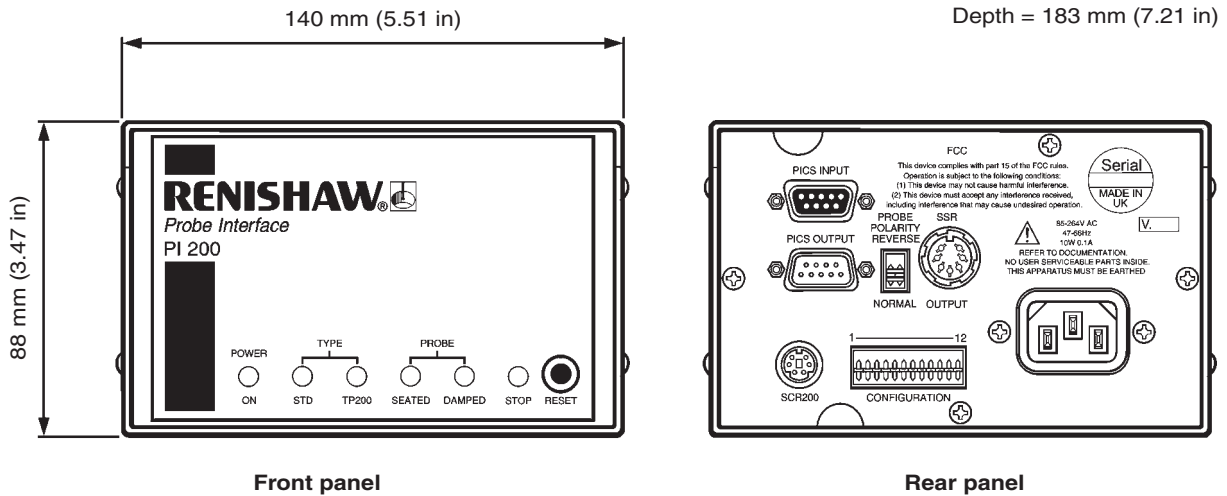
|   |   |                                     |
|---|---|-------------------------------------|
| <b>Weight</b>   | 0.75 kg   |                                     |
| <b>Mounting orientation</b>   | Vertical or horizontal  |                                     |
| <b>Mounting fixture</b>   | Single stud (M8, M10)   |                                     |
| <b>Number of ports</b>  | 6   |                                     |
| <b>Repeatability of stylus change (2<math>\sigma</math>) at 50 mm</b> | <b>Automatic</b>  | $\leq 1 \mu\text{m}$                |
|   | <b>Manual</b>   | $\leq 2 \mu\text{m}$                |
| <b>Entry speed</b>  | Unrestricted  |                                     |
| <b>Module pull-off force</b>  | 800 g maximum   |                                     |
| <b>Overtravel protection</b>  | Electromechanical (5° minimum deflection)                               |                                     |
| <b>LED indicators</b>   | <b>Power</b>  | Green                               |
|   | <b>Status</b>   | Red (flashing during probe inhibit) |
| <b>Change cycle detection</b>   | Optoelectronic beam system with Hall effect proximity sensor            |                                     |
| <b>Multi-rack usage</b>   | Up to two SCR200 units (12 units) may be connected with a special cable |                                     |

## Installation

All alignment requirements and port docking coordinates can be established with only eight probing points. No control signals from the CMM are required.

|                               |  |
|-------------------------------|--|
| <b>Alignment adjustment</b>   | XY rotational only $\pm 0.1 \text{ mm}$                        |
| <b>Docking tolerance</b>      | $\pm 0.17 \text{ X}, \pm 1.5 \text{ mm Y}, \pm 2 \text{ mm Z}$ |
| <b>Power supply / control</b> | PI 200 interface   |
| <b>Cable length</b>           | 20 m maximum (PI 200 to SCR200)                                |
| <b>Cable connection</b>       | 6-pin miniature DIN socket                                     |
| <b>Set-up time</b>            | <30 minutes  |

## PI 200 dimensions



## Specification

|                               |   |                  |
|-------------------------------|---|------------------|
| <b>Size</b>                   | 1/3 19" rack × 2U high (140 mm × 88 mm × 183 mm)              |                  |
| <b>Mounting</b>               | 19" rack mounting or freestanding                             |                  |
| <b>Weight</b>                 | 1.6 kg  |                  |
| <b>Power supply</b>           | Universal: 85 - 264 V, 50 / 60 Hz                             |                  |
| <b>Probe compatibility</b>    | TP200 or TP2 / TP6 probes                                     |                  |
| <b>Probe recognition</b>      | Automatic, ≤ 1.5 s  |                  |
| <b>Power connector</b>        | IEC 320   |                  |
| <b>Probe input connector</b>  | 9-way D socket (Renishaw PICS standard)                       |                  |
| <b>Probe output connector</b> | 9-way D plug (Renishaw PICS standard) or 7-pin DIN SSR socket |                  |
| <b>SCR200 connector</b>       | 6-pin miniature DIN socket                                    |                  |
| <b>Temperature range</b>      | Operating   | 0 °C to 50 °C    |
|                               | Storage   | -10 °C to +70 °C |
| <b>Probe signal cable</b>     | 50, maximum resistance 5Ω/conductor                           |                  |

## System installation and compatibility

The TP200 probe system is compatible with all Renishaw M8 (2-wire) probe heads and extension bars. The probe may be installed on Renishaw multiwire systems using the PAA1 autojoint adaptor or PAA series extension bars. These provide access to the ACR1/ACR3 autochange system. Integration of the TP200 probe system with other Renishaw scanning or touch-trigger probe products for automatic or manual probe changing is possible but will require special connecting cables.

To obtain satisfactory performance with the full range of styli, the TP200 should be installed with CMM controllers that are able to service the control signal PDAMP (probe damping) via the Renishaw product interconnection system (PICS).

The control signal HALT (trigger confirmation) is available to aid the prevention of vibration induced triggers if required.

Some CMMs are manufactured with a TP2/TP6 type probe interface in-line with the probe head cable. It will be necessary to bypass such devices before TP200 can be installed.

For further advice and information about TP200 installation or product compatibility, please contact your CMM supplier or Renishaw.

For worldwide contact details, please visit our main website at [www.renishaw.com/contact](http://www.renishaw.com/contact)